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IS UTAH SAHARA BOUND?

In Volume 37, Number 11 of "Bulletin of the University of Utah", Dr. Cottam attempts to arouse public consciousness to the fact that serious range and watershed problems exist in Utah, that they are the concern of the general public, and that something can be done about them. By contrasting early accounts with recent investigations, he shows that significant changes have occurred in all of the major vegetation types as a result of a century of use by white men. Both quantity and quality of forage has been drastically reduced and the protective vegetation of vast watersheds so disturbed that severe erosion and floods have occurred. These have already impaired the welfare of local communities and now threaten, if allowed to continue, to undermine the entire economy of the State. Public awakening to the seriousness and significance of existing problems must precede remedial action. The answer lies in public education.

A Digest

The year 1947 marks the one hundredth anniversary of the coming of the Mormon pioneers to the Valley of the Great Salt Lake. This should be a festive year for Utah. If Utahans accept the thesis that the soil and plant resources of the state have been the basis of its economy during the past century and for the future must continue to be, it should also be a year of serious reflection and meditation.

Due to a favorable altitudinal position, plus an altitudinal range of from 2,500 to more than 13,000 feet and extremely variable precipitation and soils, Utah is rich in numbers of plant species and types of communities. The principal types are:

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I - Desert Vegetation

- A. Warm temperate desert shrub - Dixie area of Washington County, 2,500 to 3,500 feet elevation, broadleaved evergreen shrubs.
- B. Cold temperate desert shrub - Colorado and Great Basin desert areas.
- C. Salt marsh - Poorly drained, alkaline and saline clay soils in both A and B.
- D. Pigmy conifers - Juniper and pinon pine at 5,000 to 7,000 feet elevation.

II - Mountain Vegetation

- E. Mountain shrubs
 - (1) Broadleaf evergreen
 - (2) Deciduous shrub
- F. Mountain Deciduous Forest
 - (1) Maple-Valley bottoms at 5,500 to 7,000 feet elevation
 - (2) Streamside trees
 - (3) Aspen forests
- G. Mountain Coniferous Forests
 - (1) Yellow pine
 - (2) Lodgepole pine
 - (3) Spruce-fir
- H. Alpine-artic types
 - (1) Tundra
 - (2) Subalpine grassland

Numerous comparisons of historical accounts with recent field investigations show that substantial changes have occurred in Utah's vegetation during the past century. Tremendous areas of the Bonneville Desert formerly occupied by grass have given way almost entirely to sagebrush. Foothill sagebrush-grass areas are being invaded by juniper. Hillside grasslands and meadow bottoms have in one generation of man seen a complete succession from grassy to shrubby types. Most of the desert vegetation in Utah has

undergone significant transformation during the past century both in quantity and quality of forage. The following summary based on a comparison of a heavily-used and an adjacent better managed valley indicates probable quantitative changes that have occurred over the Great Basin in Utah.

<u>Major types</u>	<u>% area 1937</u>	<u>% area 1847</u>
Juniper-pinon	38	10
Sagebrush	11	1
Rabbitbrush	13	1
White Sage (<i>Eurotia lanata</i>)	9	25
Shadscale	21	10
Greasewood	5	5
Grass	-	45
Miscellaneous	1	1
Playa (barren)	2	2

A comparison of vegetation between private property and adjacent forest grazing land in Wasatch county show the results of different management systems.

<u>Oak-snowberry type</u>		<u>Aspen-snowberry type</u>	
	<u>Outside (Percent)</u>	<u>Inside (Percent)</u>	
Total plant cover	82	100	99
Forage value	50	100	57
Palatable grasses	48	100	39
" herbs	39	100	66
" shrubs	58	100	92
			100

The widespread and significant changes that have occurred in Utah vegetation must be the result of one or both of the following causes: (1) major climatic changes within the century and (2) biotic causes incident to man's occupancy. Tree ring investigations, studies in the levels of Great Salt Lake and actual precipitation records dating back to 1870 do not support the thesis of a major climatic change. While all vegetational types have changed considerably both in quantity and quality of forage under grazing

use, only the foothill areas of Bonneville Basin have changed drastically in vegetative type. Grass has been replaced by desert shrubs. Several factors have contributed to this change (1) more severe grazing of foothill than of other desert or mountain vegetation (2) greater vicissitudes of weather on the deserts than in adjacent mountain areas (3) the grassy vegetation of a century ago may have been a relict or post-climax vegetation of a former post-glacial climate and was therefore ecologically unadapted to withstand grazing. This last theory will have been tested when the results of reseeding in the sagebrush foothill zone are more completely known.

Of Utah's 84,900 square miles of area, 85 percent is used in some degree for the grazing of livestock and game animals. However, in 1945 less than 4 percent of the total cash income, of 603.3 million dollars, and less than 18% of the agricultural income accrued from the grazing industry. Receipts from the Bingham Copper Mine alone were more than 3 times the income from the grazing industry. But the mines are not inexhaustible and profits from mining flow largely to capitalists outside of Utah. Even if this were not so, could its people afford or dare to continue to neglect the land resources of the ranges? The answer lies in a careful analysis of resource values that are in the main unmeasurable.

Between 1880 and 1900 sheep numbers in Utah were increased from 200,000 to 3.8 million. Cattle increased steadily from the time of early settlement until 1890 when nearly half a million were on hand. As a result of these increases in livestock the Wasatch and Uinta mountain ranges and the high plateaus of the Sevier River drainage were mined of their forage. The early nineteenth hundreds saw the beginning of the pay-off for this extravagant

exploitation of the vegetational resource -- a pay-off which has continued to the present. The Mt. Pleasant flood, July 24, 1946, which caused property damage estimated at \$106,000 traced directly to this excessive grazing use. Damage of floods to Mt. Pleasant over the last fifty years amounts to 35¢ per acre per year for the entire Pleasant Creek watershed or \$2.35 per acre per year for the deteriorated portion. The measures taken to restore these depleted mountain areas and the speed with which they are supplied will likely determine the economic wealth of the state 100 years hence.

The first step in the solution of soil problems is public enlightenment of the facts of erosion and what they mean to the individual. There are many examples of accelerated erosion; the North Oquirrh, Sevier River drainage, Uinta and Duchesne. The Davis county floods have cost \$1,300,000 in property damage and control costs. The latter were unquestionably justified for two reasons: (1) the contouring and reseeding has successfully stopped the floods from the areas treated and (2) the object lessons on the importance of vegetation in watershed protection and on methods of flood control are practically invaluable to an enlightened citizenry.

The future of the State depends upon the proper management of the renewable resources. These values include:

1. Water
2. Forage
3. Forests and forest products
4. Recreational uses

The Forest Reserves in Utah were set aside nearly 50 years ago for the maintenance of favorable water conditions. To date, overall gains in watershed conservation are not substantial. Soil loss still continues, re-vegetation is needed, livestock numbers need to be reduced and, worst of all, the original idea of water conservation as a basis for forest land management has been lost in the popular demand for big game and livestock production.

Utah will attain a stabilized prosperity only when and if the public consciously adopts, maintains and enforces a program of resource use based upon the democratic ideal "the greatest good to the greatest number -- and for the longest time". Public consciousness in conservation matters will never be attained without a well-informed teaching personnel in the public schools. A program on conservation education involves all of the natural resources. The success of such a program depends upon a popular understanding of the following:

1. The basic dependence of civilization on an adequate plant cover and on soil.

There is a general public need for information on the history of use; the consequences of mismanagement on plant succession, on the soil, on floods and water deficiencies; and the relationship of these losses to society in general.

2. Land ownership and multiple land use.

America and Utah grew up under the conviction that the highest form of land ownership is the possession and holding in fee simple by the individual. Laws were passed by Congress to bring all public lands under private ownership. More acts of Congress, however, cannot change fundamental land values or land uses imposed by nature and today 72 percent of Utah's total area remains in public ownership. Unrestricted exploitation of these lands resulted in disaster.

The currently popular issue of private ownership versus continued public control lies between the livestock interests and the local public and not, as many think, between the western stockgrower and Washington, D. C. It is high time that Utah citizens become aroused to these matters of land ownership.

3. The need of a sustained program of revegetation.

Society must accept the responsibility for the present poor condition of wildlands in Utah. The success of reseeding experiments has been phenomenal and it should be the task of the schools to foster public consciousness of the moral responsibility of this and future generations for a sustained revegetation program.

4. The values and limitations of the recreational use of land.

Recreation furnishes the greatest popular use of the land resources. Sportsmen with empty creels are inclined to blame their ill luck on inadequate stream stocking rather than to deer and livestock overpopulation and the consequences in decreased forage, soil erosion, floods and water pollution. A public that fails to temper emotion with reason deserves the type of game management it receives.

5. The need for new legislation.

New laws must follow rather than precede a public awakening.

/s/ E. J. Woolfolk

Forest Service

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